

Virtual Engineering Specification

Background :

I worked in Aerospace Quality Engineering and Automotive Racing fields for a few decades . And have used the most current technologies . Common Industry Practice such as Aerospace , Automotive and Commercial Manufacturers use Tooling Points or Datum Target Points to Locate or Fixture a part . Usually 3 points on a plane (Primary), 2 points on a Perpendicular plane (Secondary) , and 1 point to lock rotation (Tertiary) . The purpose is to achieve the best condition (True Position) for measuring or machining the part .

Currently the most versatile fixturing is called Modular .which consists of a Base Plate with prearranged multiple holes , with pins fit to the holes , Modular Fixturing is limited to the distance between the holes with pins , the only way to locate between 2 pins is by adding shims or other components . This increases costs to manufacture , operator set up time .

Virtual Engineering **Specification**

Operations Description :

By bolting assembled base plate on machined surface to secure location. Then choosing 1 tooling point to position by turning knob on the side of Base Plate (clockwise or counter clockwise)will move point along horizontal plane ("X" or "Y") then lock with set screw . Secondly, pivot Riser Base to desired location which may include turning Knob (clockwise or counter clockwise) on the side of Riser Base to achieve location , and lock by tightening screws . Thirdly turn Knob (clockwise or counter clockwise) at the top of Riser to achieve desired location and lock with set screw .

The set Point can be measured by Height Gage or similar device for exact location, or can be set to predetermined Gage Block or Blocks and turn Knobs on fixture to intersect Tooling ball/point with Gage Block .

Repeat for each individual Tooling Ball/Point until you have achieved your final location .
As a result you end up with a precise location of a working part , which then all theoretical centers and positioning can be measured or machined .

Virtual Fixturing **Specification**

Objectives / Advantages : There are two main objectives , with many subsequent advantages .

One objective was to create a fixture that was better than current methods of holding parts . Virtual Fixture lets user change from one part to be inspected to a different part , without adding or taking off multiple components to get proper configuration for new part .

Second Objective was to create it as simple as possible . By using a Base Plate configured to your needs . you would only need to have one fixture which enabled user to get same results faster while keeping manufacturing costs and set – up times down .



Virtual Fixturing

Reference Numeral Listing

Figure #1 :

- 1 = Base Plate
- 2 = Coupler (threaded center / attaches to Pivot under Riser Base)
- 3 = Bored Hole , for Assembly to fit in
- 4 = Bearing (2X at both ends of threaded rod)
- 5 = Slot for Pivot
- 6 = Slot for connecting Coupler to Pivot
- 7 = Threaded Rod
- 8 = Knob

Figure #2 :

- 1 = Riser Base
- 2 = Knob
- 3 = Threaded Rod
- 4 = Pivot
- 5 = C ' Bore (for connecting Pivot to Base Plate Coupler / and
connecting Riser Base to Pivot)
- 6 = Coupler (Base Plate)
- 7 = Threaded Rod (Base Plate)
- 8 = Bolts (locking Riser Base)
- 9 = Pivoting Pin

Virtual Fixturing

Reference Numeral Listing (cont.)

Figure #2 : 10 = C ' Bore (for Riser pivoting / and location)

11 = Threaded Holes to lock Riser rotation

12 = Bearings (at both ends of threaded rod)

13 = Coupler (Riser Base)

Figure #3 : 1 = Riser body

2 = Threaded Rod

3 = Coupler (Riser to Probe)

4 = Bearings (at both ends of Threaded Rod)

5 = Slots (rotated around base of Riser connecting to Riser Base)

6 = Probe

7 = Knob